

**Modular optical transceiver**

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 SG143283 (A1)  
 SG108973 (A1)  
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Cited documents:

 WO0152454 (A1)  
 US4441181 (A)  
 XP002296738 (A)  
 XP002296739 (A)  
 XP002296740 (A)

**Abstract of EP 1503232 (A2)**

An optical transceiver (100) converting and coupling an information-containing electrical signal with an optical fiber including a housing (102) conforming to the industry standard XENPAK&lt;TM>; form factor including an electrical connector for coupling with an external electrical cable or information system device and for transmitting and/or receiving an information-containing electrical communications signal, and a fiber optic connector (124,126,128,130) adapted for coupling with an external optical fiber for transmitting and/or receiving an optical communications signal.; At least one electro-optical subassembly (110) is provided in the housing for converting between an information-containing electrical signal and a modulated optical signal corresponding to the electrical signal, along with a modular, interchangeable communications protocol processing printed circuit board (112) in the housing for processing the communications signal into a predetermined electrical or optical communications protocol, such as the IEEE 802.3ae 10 Gigabit BASE LX4 physical layer.

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(54) Modular optical transceiver

(57) An optical transceiver (100) converting and coupling an information-containing electrical signal with an optical fiber including a housing (102) conforming to the industry standard XENPAK™ form factor including an electrical connector for coupling with an external electrical cable or information system device and for transmitting and/or receiving an information-containing electrical communications signal, and a fiber optic connector (124, 126, 128, 130) adapted for coupling with an external optical fiber for transmitting and/or receiving an optical communications signal. At least one electro-op-

tical subassembly (110) is provided in the housing for converting between an information-containing electrical signal and a modulated optical signal corresponding to the electrical signal, along with a modular, interchangeable communications protocol processing printed circuit board (112) in the housing for processing the communications signal into a predetermined electrical or optical communications protocol, such as the IEEE 802.3ae 10 Gigabit BASE LX4 physical layer.



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## EUROPEAN SEARCH REPORT

Application Number  
EP 04 01 7693

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	WO 01/52454 A (SANCHEZ JORGE) 19 July 2001 (2001-07-19)	1,2,10, 18	G02B6/42 H04J14/02
Y	* pages 7,11; figures 1a,1b,2a,2b,5b,7 *  * page 13 - page 17 * * page 25, line 13 - line 27 * * page 6, line 4 - line 16 * -----	5-7,16, 17	H04B10/24
Y	US 4 441 181 A (MAHLEIN HANS ET AL) 3 April 1984 (1984-04-03) * column 4, line 13 - line 40; figures 4,5 * -----	5-7,16, 17	
X	ANONYMOUS: "Agilent Technologies HFCT-701XB10 GBASE-LR XENPAK Transceiver Product Overview" INTERNET ARTICLE, [Online] 30 January 2003 (2003-01-30), XP002296738 Retrieved from the Internet: URL:http://cp.literature.agilent.com/litweb/pdf/5988-7666EN.pdf> [retrieved on 2004-09-16] * the whole document *	1,9,10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
X	ANONYMOUS: "Infineon Technologies Paroli 2 Parallel Optical Link Module Description" INTERNET ARTICLE, [Online] February 2003 (2003-02), XP002296739 Retrieved from the Internet: URL:http://www.infineon.com/cmc_upload/documents/037/667/Paroli_8159-H8007-G2-X-7600.pdf> [retrieved on 2004-09-16] * the whole document *	1	G02B H04B H04Q
		-/--	
-The present search report has been drawn up for all claims			
3	Place of search Berlin	Date of completion of the search 5 October 2004	Examiner Andreassen, J
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons * : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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## EUROPEAN SEARCH REPORT

Application Number  
EP 04 01 7693

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	<p>ANONYMOUS: "Finisar Corporation 1000BASE-T Copper GBIC Transceivers FCM-8520/8521-3 Product Specification Rev.A"</p> <p>INTERNET CITATION, [Online] February 2003 (2003-02), XP002296740 Retrieved from the Internet: URL: <a href="http://finisar.com/optics/documents/site2_2053158015_FCM-8520-3_and_FCM-8521-3_Spec_RevA.pdf">http://finisar.com/optics/documents/site2_2053158015_FCM-8520-3_and_FCM-8521-3_Spec_RevA.pdf</a> [retrieved on 2004-09-16] * the whole document *</p> <p>-----</p>	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
<p><del>The present search report has been drawn up for all claims</del></p>			
Place of search		Date of completion of the search	Examiner
Berlin		5 October 2004	Andreassen, J
CATEGORY OF CITED DOCUMENTS		<p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>	
<p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p>			

EPC Form 1503 (12.02.2004)



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Application Number  
EP 04 01 7593

#### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

#### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1,2,5-7,9,10,16-18



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LACK OF UNITY OF INVENTION  
SHEET B

Application Number  
EP 04 01 7693

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1,2,5-7,9,10,16-18

An electro-optical wavelength-division-multiplexer wherein the individual laser beams are guided to the multiplexer via a plurality of optical fibers which are mounted onto a flexible substrate (claim 5)

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2. claims: 3,4,8,15

An electro-optical wavelength-division-demultiplexer wherein the output beams from the multiplexer are focussed onto a photodiode array disposed on a printed circuit board (claim 8)

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3. claims: 11-14

An electro-optical transceiver comprising interconnected interchangeable subassemblies in order to allow a modular configuration of the transceiver (claim 14)

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# ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 04 01 7693

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on the European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-10-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0152454 A	19-07-2001	US 6446867 B1	10-09-2002
		AU 2453801 A	24-07-2001
		AU 2594601 A	09-07-2001
		CA 2366970 A1	19-07-2001
		EP 1155519 A1	21-11-2001
		EP 1350096 A2	08-10-2003
		WO 0152454 A1	19-07-2001
		WO 0148471 A2	05-07-2001
		US 6494370 B1	17-12-2002
		US 6629638 B1	07-10-2003
US 4441181 A	03-04-1984	DE 3037712 A1	13-05-1982
		AT 11852 T	15-02-1985
		AU 542032 B2	31-01-1985
		AU 7600881 A	22-04-1982
		DE 3168917 D1	28-03-1985
		DK 440981 A ,B,	07-04-1982
		EP 0049822 A1	21-04-1982
		FI 813079 A ,B,	07-04-1982
		JP 57091042 A	07-06-1982
		NO 813356 A ,B,	07-04-1982

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For more detail about this annex : see Official Journal of the European Patent Office, No. 12/82